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UTILITY PATENT APPLICATION

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TITLE: **FLUID RECEPTACLE AND FILTER SYSTEM**

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TITLE OF THE INVENTION

FLUID RECEPTACLE AND FILTER SYSTEM

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TECHNICAL FIELD

This invention relates generally to filter systems that are useful for separating relatively heavy particles of debris that are suspended in solution from the solution itself, and specifically to a filtration system for separating relatively heavy particles of debris from dirty wash water contained in a receptacle such as a bucket.

BACKGROUND OF THE INVENTION

Despite the availability of modern paints and clear coating, the finish of many vehicles such as boats, automobiles, and motorcycles is still susceptible to scratches and abrasions. One source of such scratches and abrasions can be the dirt and debris that often accumulates on the rags or mitts used to wash the exterior of these vehicles. When a dirty wash rag or mitt is placed in a bucket of soapy water for rinsing, the grit and debris that has been picked up from the surface of the car or boat is transferred into the wash water. As the water becomes dirtier, the rag or mitt may actually pick up the grit or debris that has become suspended in the wash water or that has accumulated at the bottom of the bucket. Thus, the wash rag or mitt is not effectively rinsed clean, and the grit and debris that is picked up by the rag from the dirty water is likely to be transferred back onto the exterior of the car, boat, or motorcycle where it can do significant damage to the vehicle's finish.

Given this potential damage to the exterior finish of a vehicle, there is a need for an inexpensive and effective system for separating grit and debris from the water or other fluid

that is used to wash vehicles or other items with surfaces that are susceptible to scratches and abrasions.

SUMMARY OF THE INVENTION

This invention provides a system for separating particles of dirt, gravel, grit, and other potentially damaging debris from a wash fluid such as water when such fluid is contained in a receptacle such as a bucket. While the filter assembly of the present invention may be used with a variety of receptacles, in a preferred embodiment, the present invention includes a receptacle that has been manufactured specifically for use with the filter assembly. Preferably, the filter assembly itself is shaped such that it matches the shape of the receptacle and fits firmly within the receptacle. In a preferred embodiment, the receptacle and filter assembly is manufactured as an integrated unit, wherein the dimensions of the receptacle correspond to the dimension of the filter assembly.

The filter component of the filter assembly has an upward facing side and a downward facing side and is made from a hard mesh, screen, or any other suitable screen-like material. Preferably, the upward facing side of the filter component includes crossbars that are tapered to minimize the surface area of said filter component. These tapered crossbars may also include barbs or other similar structures on the downward facing side of the filter assembly that facilitate the retention of dirt particles below the filter assembly.

In a preferred embodiment, an o-ring or similar structure encircles the outer edge of the filter component for securing the filter assembly in the receptacle and, ideally, forming a temporary seal between the receptacle and the filter assembly. This temporary seal helps to minimize the back-flow of dirt or grit into the fluid above the filter assembly. In alternate embodiments of this invention, the o-ring is either formed of the same material as the filter component or is simply not present. At least two baffles attached to the downward facing side of the filter component reduce the motion of the wash fluid around and through the filter assembly. These baffles may include secondary baffle-like structures attached at right angles to the primary baffles for further reducing the movement of fluid below the filter assembly.

In a preferred embodiment, the filter component includes at least one aperture that passes though the filter component and provides a means by which a user of the system may easily remove the filter assembly from the receptacle. Preferably, the aperture or apertures are

defined by a band or ring of material that is either separate from the material of the filter component or formed from the material of the filter component.

Further advantages of the present invention will become apparent to those of ordinary skill in the art upon reading and understanding the following detailed description of the preferred embodiments.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1A is an exploded view of the fluid receptacle and filter system of the present invention.

FIG. 1B is a perspective view of the fluid receptacle and filter system of FIG. 1A showing the preferred placement of the filter assembly in the fluid receptacle.

FIG. 1C is a cross sectional view of the fluid receptacle and filter system of FIG. 1 showing the preferred placement of the filter assembly in the fluid receptacle.

FIG. 2A is a perspective view of the top of the filter assembly.

FIG. 2B is a perspective view of the bottom of the filter assembly.

FIG. 3A is a cross sectional perspective view of the filter component of the filter assembly of FIG. 2A and FIG. 2B showing the internal construction of the filter component.

FIG. 3B is a cross sectional side view of the filter component of the filter assembly of FIG. 2A and FIG. 2B showing the internal construction of the filter component, particularly, the tapered shape of the upward facing side of the cross-bars of the filter component.

DETAILED DESCRIPTION OF THE INVENTION

The present invention provides a fluid receptacle and filter assembly for separating particles of gravel, dirt, grit and other relatively heavy debris from the wash water or other fluid contained in a bucket or other receptacle. In the context of this invention, "particle" refers to any and all debris that is heavy enough to fall out of suspension in a liquid or sink to the bottom of a bucket or other receptacle due to the effect of gravity.

As best shown in FIG. 1A, 1B, and 2A, and according to a preferred embodiment, fluid receptacle and filter system **10** includes filter assembly **12**, receptacle **26**, and a lid for receptacle **26** (not shown). Filter assembly **12** further includes o-ring **14** and filter component **16** which further comprises crossbars **18**, apertures **20**, and baffles **24**. In a preferred embodiment, o-ring **14** encircles filter component **16** and may be manufactured from plastic, rubber, or any other suitable material. Preferably, filter component **16** is manufactured from plastic or hard rubber and comprises a plurality of crossbars **18** that form a mesh or net. The distance between cross-bars **18** is, preferably, about 0.01 cm to 3.0 cm although greater or lesser distances may be incorporated into filter component **16** depending on the size of the particles that the user wishes to separate from the wash fluid. The thickness of filter component **16** is, preferably, about 0.1 to 3.0 cm, although greater or lesser thickness may be suitable based on the materials used to manufacture filter system **10**.

In one embodiment, the spaces between crossbars **18** are shaped to form funnel-like structures to encourage dirt and debris to pass through filter component **16**. In alternate embodiments, the spaces between crossbars **18** are honeycomb shaped, round, oval, or square. In other embodiments, filter component **16** is divided into a plurality of sections, each section comprising a screen wherein crossbars **18** are either oriented toward the center of filter component **16**, or wherein crossbars **18** comprise a variety of different configurations. For example, one section of filter component **16** may be honeycombed, while an adjacent section may comprise square openings between the crossbars. Numerous different configurations are possible. Additionally, in an alternate embodiment, the upward-facing surface of filter component **16** includes a plurality of protrusions that facilitate the removal of grit or dirt from a wash rag or mitt.

In a preferred embodiment, a single filter assembly **12** is placed inside receptacle **26** when this invention is in use. However, in alternate embodiments, multiple filter assemblies are placed on top of one another inside receptacle **26**. In still other embodiments, multiple filter assemblies are used, and each filter assembly comprises a filter component having a crossbar arrangement different from the other filter assembly or assemblies.

In a preferred embodiment, and as shown in FIG. 3B, the upward-facing surfaces of cross bars **18**, are shaped or tapered into narrow ridge to minimize the surface area of the upward facing side of filter component **16** upon which dirt or debris can come to rest. In alternate embodiments, the downward-facing surfaces of crossbars **18** also include barbs or other similar structures that, in cross-section, give each crossbar **18** the appearance of an arrowhead.

As best illustrated in FIG. 2A and FIG. 2B, a preferred embodiment of filter assembly **12**, further includes at least one, and preferably two, apertures **20**. Alternate embodiments include additional apertures **20**. Preferably, the outer edge of each aperture is defined by a ring **22** of plastic, hard rubber, or other suitable material and are designed to accommodate the thumb and one finger of a user of this invention so that filter assembly **12** may be easily removed from receptacle **26**.

As shown in FIG. 2B, at least two baffles **24** are attached to, or formed as part of, the bottom of filter component **16**. Preferably, these baffles are manufactured from plastic, hard rubber, or any other suitable material and are attached to the bottom or downward facing side of filter component at right angles to one another. In alternate embodiments, additional baffles are attached to the bottom of filter component **16** and are not mounted be at right angles to one another. In still another embodiment, baffles **24** include secondary baffle-like structures attached to or formed at right angles to the primary baffles for further reducing the movement of fluid below the filter assembly.

Preferably, fluid receptacle and filter system **10** is used by first filing receptacle **26** roughly two-thirds full of water or other fluid. Filter assembly **12** is then placed into receptacle **26** where it sits at the bottom of receptacle **26**. Filter assembly **12** is held in place by o-ring **14** which forms a seal with the inside surface of receptacle **26**. After the rag or mitt which is being used to wash a vehicle or other surface picks up grit or debris, the user of this

invention places the rag or mitt into the bucket and strikes or shakes the rag or mitt against filter assembly **12**. The grit and debris is loosened from the rag and becomes suspended in the wash fluid. After the rag or mitt is removed, the heavier particles pass through filter component **16** and come to rest on the bottom of receptacle **26**. When filter assembly **12** is placed in receptacle, as shown in FIG. 1B and FIG. 1C, baffles **24** reduce the motion of the wash fluid in the bottom of receptacle **26**, and consequently reduce the back-flow of fluid and particles into the fluid above filter assembly **12**. Thus, the wash fluid above filter assembly **12** is kept relatively free of the abrasive dirt, gravel, grit, and debris that can be transferred back onto the wash rag or mitt.

Preferably, fluid receptacle and filter system **10** is manufactured as an integrated unit so that filter assembly **12** fits securely in receptacle **26**. However, in alternate embodiments, filter assembly **12** is manufactured in a variety of sizes and shapes such that it may be utilized with any of a number of different buckets or other receptacles suitable for containing fluids. In one embodiment, filter assembly **12** is manufactured or cast as a single piece or unit that includes all of the features described above. In still another embodiment, filter assembly **12** and receptacle **26** are made from a single cast and form one continuous structure, i.e., filter assembly **12** is an inseparable part of receptacle **26** and cannot be removed. In still another embodiment, filter assembly **12** does not include baffles **24** because these structures are pre-formed in the bottom of receptacle **26**. In this embodiment, filter assembly **12** includes ridges or grooves for securing the filter component to the baffles **24**.

While the above description contains many specificities, these should not be construed as limitations on the scope of the invention, but rather as exemplification of preferred embodiments. Numerous other variations of the present invention are possible, and it is not intended herein to mention all of the possible equivalent forms or ramifications of this invention.